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higher and lower plants," in the *Am. Naturalist* for August and September, 1887, has just been distributed as a reprint.

AN ELABORATE study of the structure, development and affinities of *Trapella*, a new genus of Pedalineæ, is presented by F. W. Oliver in the *Annals of Botany* (June), and now distributed as a reprint. It is a Chinese plant of doubtful affinity, but this study rests it in Pedalineæ, as the only genus of a new tribe. It contains certain structures of great interest biologically. The five handsome double-page plates form a fitting accompaniment to a very fine piece of work.

ONE of the best local catalogues we have seen is that of Middlesex county, Mass., prepared by Messrs. Dame and Collins.<sup>8</sup> Not only is it printed with great care, but contains just the information one desires. In addition to the usual presentation of phanerogams and pteridophytes, it contains the mosses, liverworts, stoneworts, algæ and lichens. Dealing with an old country and one full of collectors, the list must be a very complete one. The summary shows an enumeration of 2061 species, 1,484 of which are phanerogams, 60 pteridophytes, 156 bryophytes and 361 thallophytes. In a private letter the authors say that the name of Mr. I. C. Martindale was inadvertently omitted from the list of those who had aided in the work.

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## NOTES AND NEWS.

IN A RECENT fire the Syracuse Botanical Club lost all of its collections, books and instruments.

MR. LESTER F. WARD's address on "Asa Gray and Darwinism" has just been distributed.

DR. G. F. KOHL, *privat-docent* in Marburg, became associated with Dr. Uhlworm in editing the *Botanisches Centralblatt* on the first of August last.

MR. F. W. ANDERSON, of Great Falls, Montana, has been appointed a special agent in the Division of Botany of the Agricultural Department.

THE *Journal* of the Elisha Mitchell Scientific Society, in its first part for 1888, contains a preliminary list of North Carolina Desmids by W. L. Poteat.

THE ILLUSTRATIONS of our native plants in *Garden and Forest* for August include *Cypripedium Californicum* (8th), and *Erythronium Hendersoni* (29th).

M. L. MOROT (in *Journ. de botanique*) shows that the anatomical structures of the anomalous *Adoxa Moschatellina* are more suggestive of Saxifragaceæ than of Caprifoliaceæ.

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<sup>8</sup> DAME, L. L., and COLLINS, F. S.—*Flora of Middlesex county, Mass.* Pp. 201, with map. Malden: Middlesex Institute. 1888.

REPORTS from the recently established agricultural experiment stations are beginning to come in rapidly. We have before us various kinds of reports from Indiana, Michigan, Illinois and Iowa.

DR. BESSEY (*Am. Naturalist*, June) suggests that the development of chlorophyll-bearing tissue in young fruit is for the nutrition of the embryo in the seed, and remarks that this is an important but overlooked function.

THE LARGE and important collection of fungi belonging to the late Dr. G. Winter has been purchased by the Botanical Museum in Berlin. It is well that this valuable herbarium is to be kept together and be accessible to students.

PROLIFEROUS strawberries are not so common, and the *Gardener's Chronicle* (August 18) figures one that has three or four buds from the sides, one of them so fully organized as to have leaves, adventitious roots, a beginning runner and a terminal flower.

PROF. W. W. BAILEY reports finding recently a fully-doubled Aster, all the disk florets changed into ligulate ones, between Lake Oskawana and Garrison's, N. Y., near Cowpens Mt. The species is probably *A. macrophyllus*. All the heads on the plant were so doubled.

DR. JOSEPH SCHRENK gives, in the *Druggists' Bulletin* for August, two papers, entitled "Pharmacognostical notes on the bark of *Sycocarpus Rusbyi*," and "Pharmacognostical notes on the bark of *Newbouldia levis*." The papers are illustrated by two admirable figures.

OUR KNOWLEDGE of the plants of the interior of China is rapidly advancing, judging by the rate at which lists and new species are being published. In the *Journal of Botany* (August) Dr. J. G. Baker catalogues two recent collections of ferns, among which are described sixteen new species.

IN LOOKING over Schimper's herbarium at Kew, Mrs. E. G. Britton has discovered a specimen of *Ulota phyllantha*, labelled in Schimper's own handwriting, "Muckcross, Killarney, Hibern.," which bears five capsules. The specimen was collected in 1865. This is a lesson to bryologists to look out always for fruit, even on specimens of species usually sterile.

THE ANNUAL REPORT (for 1887) of the Royal Botanic Gardens at Trinidad has been distributed by their very efficient superintendent, Mr. J. H. Hart. A summary is given of the history of the garden and its present condition. The photographic illustrations are especially interesting, giving one a notion of the beauty and plan of the gardens better than any text.

THE LAST two parts of the seventh volume of the *Annales des Sciences Naturelles (Botanique)* are almost entirely devoted to an elaborate paper by M. Courchet on chromoleucites. He discusses their development, structure and form, the relation between the color of a pigment and the form in which it exists, and finally details a special study of the pigments contained in the chromoleucites or produced by the leucites. The memoir gives a host of details, and evinces an extraordinary amount of work. It does not, however, present any essentially new principles, and agrees, in the main, with Schimper's well-known contributions on these and allied structures.

MR. C. E. OVERTON has watched the conjugation of *Spirogyra*, and finds that the conjugating tubes grow toward each other at the rate of 3 $\mu$  per hour, and that twenty four hours elapses between their contact and the complete solution of the wall. The passing over of the contents from the male cell usually begins about ten or eleven o'clock at night.

THE NEW GENUS of Palms (BOT. GAZETTE, xi, 314) from the Florida Keys, brought to light by Dr. C. S. Sargent and dedicated to him, is figured in *Garden and Forest* (September 19), where the completed generic characters are also presented. Ripe seed was obtained last year by Mr. Curtiss, and Dr. Wendland has thus been able to establish his *Pseudophoenix Sargentii*.

IN THE September *Amer. Jour. Sci.* there appears as an appendix a list of the writings of Dr. Gray, chronologically arranged. The work has been done by Drs. Goodale and Watson, assisted by Professors Farlow and C. S. Sargent, and a glance through these forty pages of fine print not only shows the great labor involved in its preparation, but also what an enormously prolific writer Dr. Gray was. Beginning with two numbers in 1834, one on mineralogy and the other the N. Am. Gramineæ and Cyperaceæ (exsiccatæ), and ending with 1888, no year is unrepresented in his writings, excepting 1839 and 1869, and even these contain editorial work. No less than 355 numbers are credited to him, besides the uncounted number of botanical notices and book reviews.

THE memorial of Asa Gray at the American Academy of Arts and Sciences has been distributed and should be in the hands of every American botanist. The resolutions were offered by the president, Prof. Joseph Lovering, and seconded in a short address by Mr. Augustus Lowell. President Eliot then spoke briefly of his relations to Harvard University. The chief interest centers about the addresses of his botanical associates, those men who did not know him afar off, but were in daily contact with him. Dr. Goodale spoke chiefly of him as an instructor, in the lecture room and through his books. Dr. Watson naturally had to deal with his relations to the great herbarium which bears his name; while to Dr. Farlow fell the more onerous duty of preparing a biographical sketch. When it is said that all of these addresses were worthy of the man they had met to honor no higher commendation is needed.

F. WENT has in the last part of Pringsheim's *Jahrbücher für wissenschaftliche Botanik* (vol. xix, pp. 295-356) an exceedingly important paper on vacuoles. His conclusions, in his own words, are as follows: With the exception of the doubtful spermatozoids, Cyanophyceæ, and Bacteria, all living cells contain vacuoles which are surrounded by a special living wall which bears the name of "tonoplast." In all young cells division and coalescence of vacuoles takes place. All normal vacuoles of a plant arise through continual division from those of the oosphere. The tonoplasts, considered as organs of the protoplasm, are of equivalent origin with the nuclei and chromatophores. Since the vacuoles, even in the youngest cells, are continually altering their shape, protoplasmic movement must take place in them, and does not begin, as Hofmeister thought, only after the meristematic state is past. Normal vacuoles never arise from the protoplasm. Pathological vacuoles are formed by the disorganization of the nuclei and chromatophores. The paper concludes with a summary of the present knowledge in regard to the vacuoles.